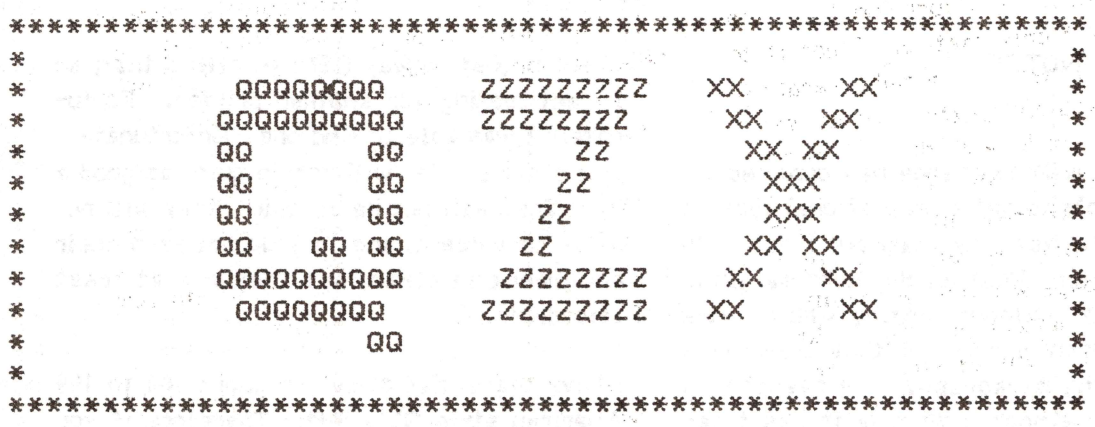

The Journal Covering Amateur Radio & Sinclair Computers
ZX80; Micro-Ace; ZX81; TS1000, 1500, & 2068; QL; Z88

Alex. F. Burr, K5XY, Publisher
2025 O'Donnell Drive
Las Cruces, New Mexico
88001

Volume 8 Number 1 ($1.50 / issue) 1989 December

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* QZX FRIENDS
* UNCLASSIFIED ADS
* EXPLORING THE TS1000 SINCLAIR LOGIC CHIP (SCL) III DON LAMEN

EDITOR'S NOTES
K5XY

The big QZX makeup change has occurred. I have been able to get a proportional type to right justify. Not only that, but I got it to microjustify too. That is, the right margin is made straight without putting whole extra spaces between words and thus creating a messy looking paragraph. The result is a column which almost looks like it was typeset. A bonus is that one can put about 10% more words on a page without decreasing the margins. A disadvantage is that it looked just a bit crowded. One of you wrote last month, commenting on the experimentation and saying not to decrease the type size, to keep the present readability. The proportional type I am now using is exactly the same size as has been used in the past, there is just less space on the average between letters. To make it look a little better I have increased the spacing between the lines by just a little bit. I know this issue will look better. The question is "Can you read it more easily?" Write and let me know.

When testing out this new type, I discovered a misspelled word in last month's issue. Right in the paragraph where I was discussing spelling too. Proofing is never done.

I had a rude awakening when I took the last issue of QZX to the printers and they rudely told me that the quantity discount had been revoked, thereby doubling the printing costs. There is just no way QZX can afford that; so I went looking for another printer. Fortunately I was able to find one. Unfortunately this other printer will not do quite as good a job. They will not be as quick, they will not be as convenient, and they do not keep their equipment as clean, but they are at least affordable.

I have heard that there are about 300 to 400 American style QL's left. Therefore if you are thinking of getting one of these Sinclair computers, now would be the time.

I have just received a catalog from AT Software Liquidators, 2640 S. Harbor Blvd., Santa Ana, CA 92704. It contained 36 programs and a special offer for 16K memory. If interested, write them.

QZX FRIENDS

W4FCJ -- Smitty has been inactive recently because he is building a major addition to his home and lost all his antenna supporting pine trees in the recent hurricane.

K2MI -- Marty is getting too many computers with the recent addition of a Zenith SuperSport. He sent a donation to the postage fund and a two page list of stuff that he would like to sell. See the unclassifieds for more details.

KD3OA -- Chris has changed his call as the result of going from Novice to Advanced in one marathon test session which caused him to miss a whole hamfest.

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Call or write for a free catalog of products for the Timex Computer

W6OOA -- Al says that he has been accepted into a good retirement complex which even permits ham antennas.

W8KBQ -- Jack is a NEW subscriber. He also ordered 33 back issues. He owns a ZX81, TS1000, and TS2068 as well as a printer.

W5GDL -- Chet renewed and sent a donation to the postage fund. He also mentioned that his grandson is active on packet with a TS1500.

WD5ERG -- Ron is a NEW subscriber. He also ordered some back issues to help get his ZX81 on packet.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: Many items for sale, including TS1000 computers, printer, 16K & 64K RAMs, printer interface, word processor, books, commercial tapes, etc. Long SASE for list. Marty Irons, K2MI, 46 Magic Circle, Goshen, NY 10924.

WANTED: One copy of 2068 VU-FILE on tape cassette w/documentation. Write or call: John A. Sampson, 23-51 123 Street, College Point, NY 11356: 718-961-2859: 7-11 PM.

QZX Discount: 15% discount on all orders mentioning QZX. T & C Services (address in ad in this issue).

WANTED: Mterm/T (or Mterm I) program; also dialing routine; and schematic diagram of Tarp PSK modem or similar. Contact me, Guillermo Garcia (LU8MAD), Cabildo 584, V. Nueva, Mendoza, ARGENTINA.

MISC

The following message appeared on the local bulletin board some time ago. Some people found it quite interesting.

From: Charlie Solie
To: Electrical Nuts
Msg #139, 15-Nov-89 08:20
Subject: Reward joke

REWARD OFFERED

A reward of 500 microfarads is offered for information leading to the arrest of Hopalong Capacity. This unrectified criminal escaped from a Weston Primary Cell where he had been clamped in ions awaiting the Gauss chamber.

He is charged with the induction of an 18-turn coil named Milli Henry, who was found choked and robbed of valuable Joules. He is armed with a Carbon Rod and is a potential killer. Capacity is also charged with driving a dc motor over a Wheatstone bridge and refusing to let the band pass.

If encountered he may offer series resistance. The electromotive force spent the night searching for him in a magnetic field, where he had gone to earth. They had no success and believe he returned Ohm via a short circuit.

He was last seen riding a Kilocycle with his friend Eddy Current, who was playing a harmonic.

EXPLORING THE TS1000 SINCLAIR LOGIC CHIP (SCL) III

Don Lamen

This article is a continuation of the series which began in the October issue of QZX. The purpose is to explain the function of the SCL logic chip in the ZX and TS1000 series of Sinclair computers. This chip is a custom chip designed particularly for our computers. The previous articles gave some background on the chip, provided a functional diagram, and listed 17 separate functions performed by the chip. This and succeeding articles will discuss these functions individually and provide an equivalent circuit diagram for the function. These circuit diagrams are only the equivalent of the actual circuits inside the chip because nothing is known about the real connections inside, but the circuits given here will perform the function of the real circuit. For a list of these 17 functions see the October issue of QZX.

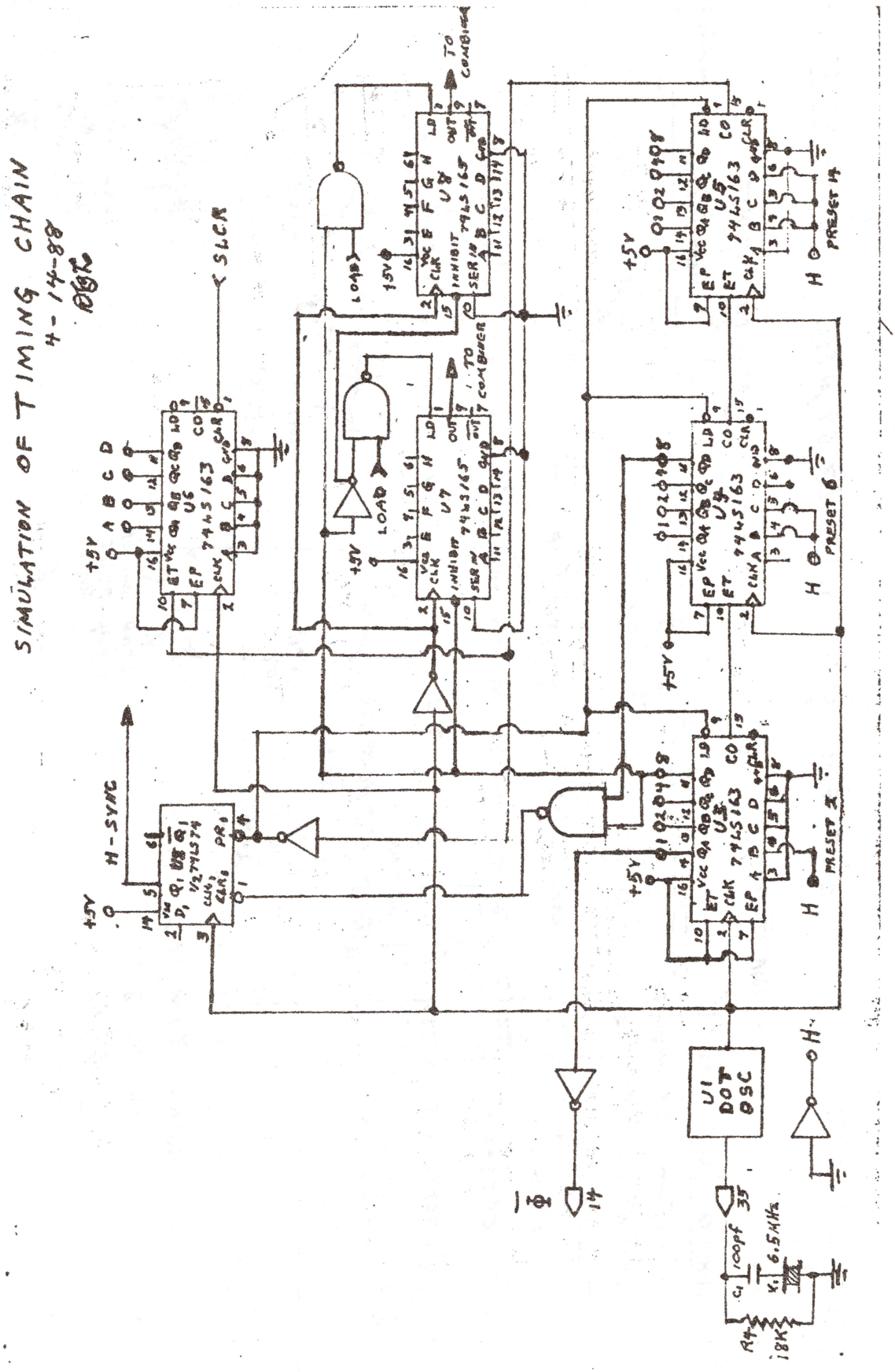
INTERNAL TIMING CHAIN

The internal timing chain must provide the following functions:

- Divide the dot clock by two to provide the processor clock signal.
- Provide turn-on and turn-off pulses to the horizontal sync flip-flop (described later), to generate the horizontal sync pulses with a duration of 38 dot cycles, at the beginning of each TV scan line.
- Provide a four bit binary counter (divide by 16). The first three bits of this counter provides the timing for the intercept circuit and the first bit may also furnish the signal for the microprocessor clock (described above), which would then be inverted and sent to pin 14. The fourth bit is used to multiplex the two shift registers. The counter's carry-out (overflow) enables the next counter in the string for one count.
- Provide a second five bit binary counter (divide by 32).

By presetting the first counter to the value of 2 and this second counter to the value of 6 and NANDing bit 4 of the first counter with bit 4 of the second counter, we obtain our turn-off pulse for the horizontal sync generator. The carry-out of this second counter provides the horizontal sync turn-on pulse terminating the scan line. This carry-out pulse also advances the character scan line counter and presets the main timing chain, thereby starting the next scan line of 414 dot cycles. (In the simulation two 4 bit counters are substituted for the 5 bit counter with the carry-out of the second counter enabling the third counter and with the third counter's carry-out taking care of the termination chores. The third counter is preset to 14.)

The next three pages contain figures for this function. The first figure is an equivalent circuit diagram for the timing chain. The next two figures on the next two pages provide some details of the timing waveforms used by the timing chain and of the timing for one scan line.


SIMULATION OF TIMING CHAIN
4-14-88
BGR
+5V
H-SYNC
SLCR
LOAD
TO
U1 DOT OSC
PRESET 14
PRESET 6
PRESET 2
1Φ
14
35
100pF
6.5MHz
18K

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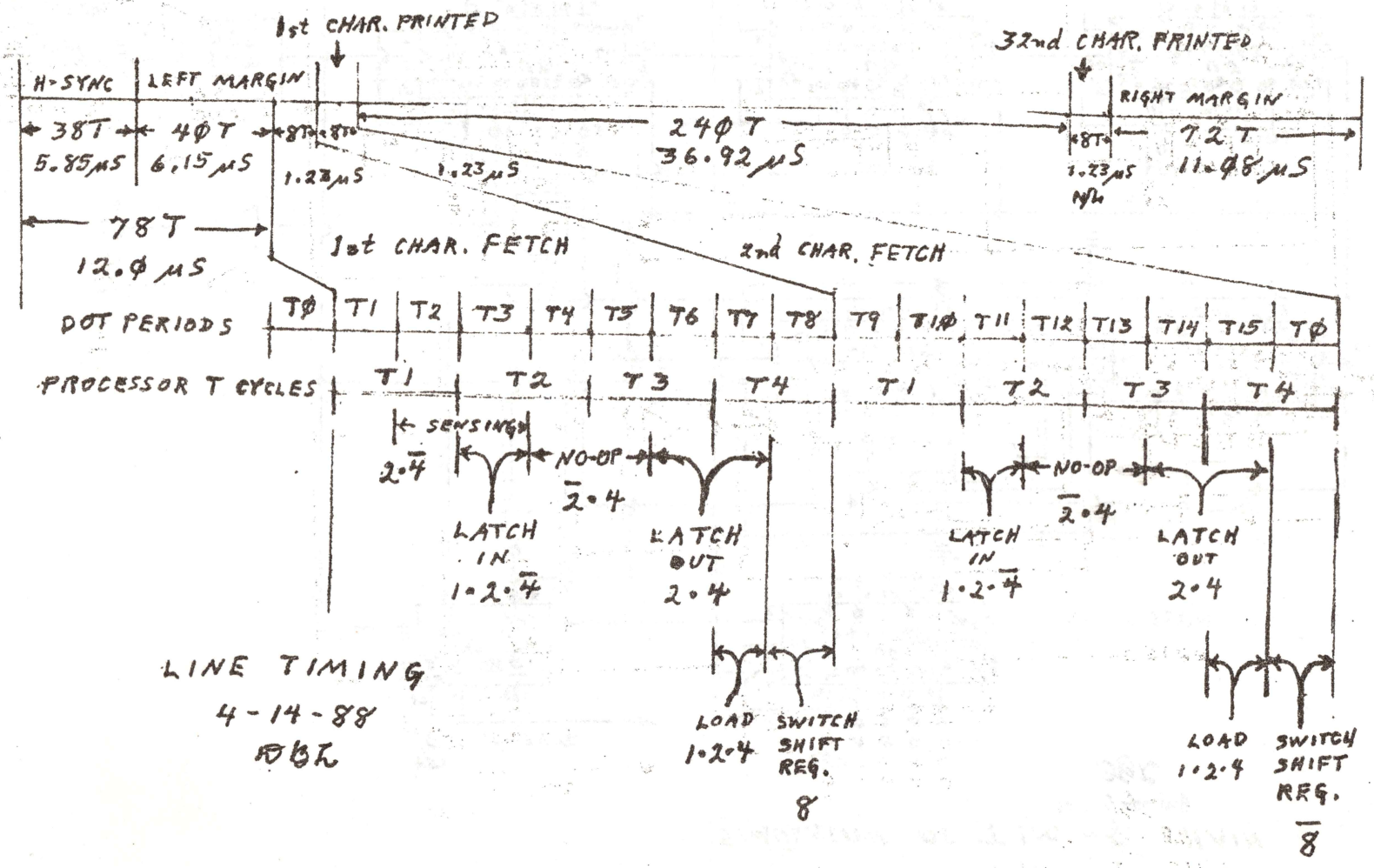
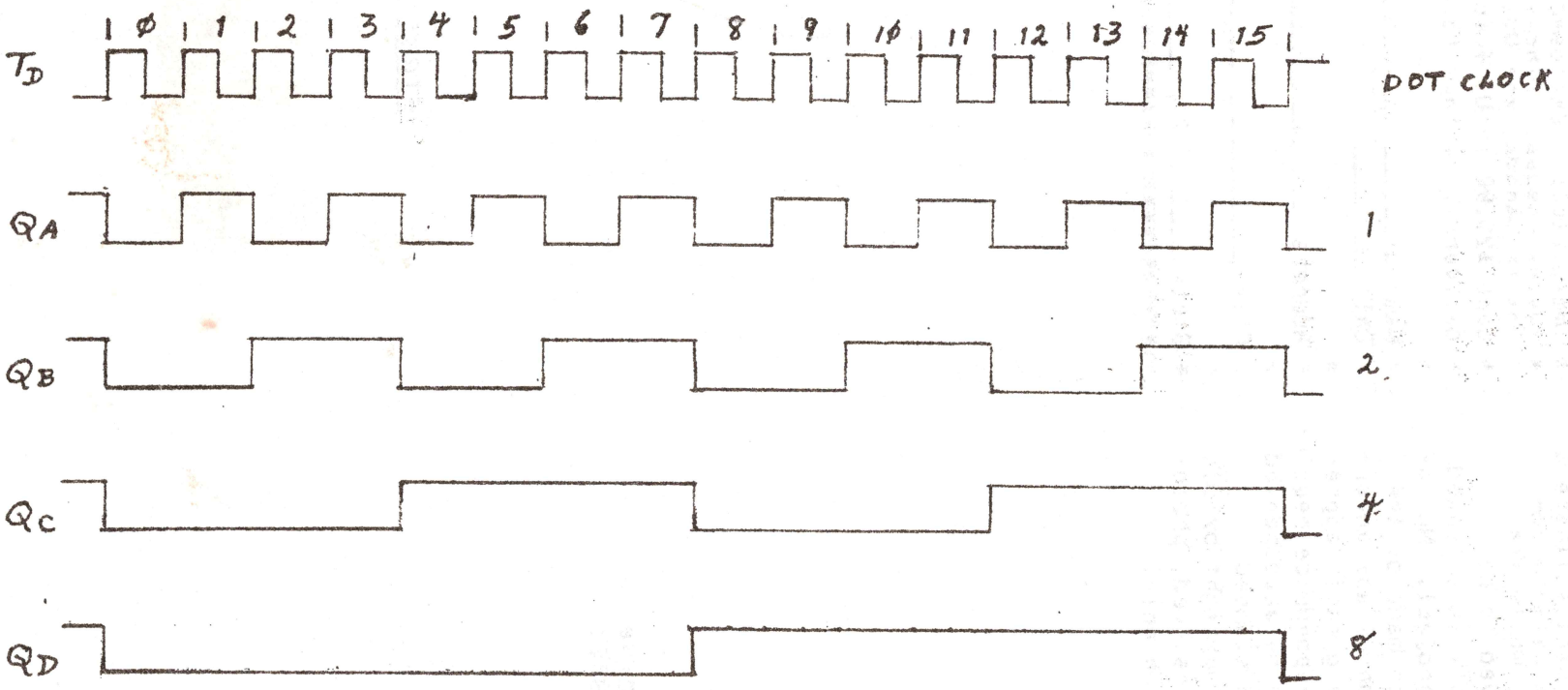
ONE SCAN LINE 414T 63.69 μ Sec.



U3 TIMING

4-18-88

RBL



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73, K5XY

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